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( पहला पुनरीक्षण )

**Amino Resins for Paints**  
( *First Revision* )

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## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Raw Materials for Paints, Varnishes and Related Products Sectional Committee, had been approved by the Chemical Division Council.

This standard was first published in 2003. Amino resins are vital cross linkers used in paint industries in industrial stoving finishes along with alkyds, epoxies, acrylics, polyester as well as in catalyzed cured lacquers. With indigenous production and growth in usage, need has been felt for preparation of this standard.

Water reducible amino resins are also available for use in environmental friendly paint system.

Raw material for paint products may contain lead and other heavy and toxic metals either because of use as catalyst or use of heavy metal other than lead based compounds in manufacturing as additives for improving performance/stability of product. Taking cognizance of the fact that lead and toxic heavy metal exposure to human being, particularly to children in residential premises is injurious to health and having adverse impact on human health and safety. The Committee responsible for formulation of this standard has felt the need to introduce restriction of lead and toxic heavy metal in all paint raw material product standards.

Revision of this standard has been taken up with a view to incorporate the maximum permissible limit of lead and heavy metal restriction clause in this standard. Therefore, in this revision, lead restriction up to a maximum permissible limit of 90 ppm and toxic heavy metals restriction as 0.1 percent maximum has been prescribed to avoid hazardous impact of lead and toxic heavy metal exposure and consequent adverse impact on environment and human health. Further, majority of consumers are not aware of the consequences of lead and other heavy metal toxicity and its long-term implications to human health. Therefore, in this revision, along with lead and toxic heavy metal restriction, a suitable cautionary notice has been included in the marking clause.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# Indian Standard

## AMINO RESINS FOR PAINTS

( First Revision )

### 1 SCOPE

This standard prescribes the requirements, methods of sampling and test for amino resins used in paint industry.

### 2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

### 3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 354 (Part 1), IS 354 (Part 6), IS 1303, IS 6667 and the following shall apply.

**3.1 Ambient Temperature** — It is a temperature between 21°C and 38°C.

### 4 CLASSIFICATION

**4.1** Amino resins may be classified as follows, based on availability and usage in surface coating industry:

- a) *n*-Butylated urea formaldehyde resins, and
- b) *n*-Butylated melamine formaldehyde resins.

**4.2** The above two major classes of amino resins may be further classified based on reactivity of resin which is in turn, based on degree of etherification (butylation) or mineral turpentine oil tolerance, as prescribed in Table 1.

### 5 REQUIREMENTS

#### 5.1 Description

The product shall be light yellow, clear liquid, free from any sediment, suspended matter, lumps, skins and become homogeneous on stirring.

#### 5.2 Lead Restriction

The material shall be tested for restriction from lead in accordance with IS 101 (Part 8/Sec 5), or by Atomic Absorption Spectrometer (AAS) or by ICP. When thus tested the material shall not contain lead or compounds of lead or mixtures of both, calculated as metallic lead exceeding 90 ppm (*see note*).

NOTE — When no lead is used during production, the product is considered lead free.

#### 5.3 Toxic Heavy Metal Restriction

Product shall not be manufactured using mercury and mercury compounds, cadmium, chromium VI, arsenic, antimony and their oxides. The material shall not contain more than 0.1 percent by weight in total of above toxic heavy metals in the form of natural impurities or impurities entailed by the production process which are contained in the raw material when tested by the relevant Atomic Absorption Spectroscopic (AAS) methods.

#### 5.4 Keeping Quality

The material when stored in normal storage condition at the ambient temperature shall retain its characteristics as prescribed in Table 2 for at least six months from the date of manufacture.

**5.5** Amino resins shall also comply with the requirements specified in Table 2.

**Table 1 Classification Based on MTO — Tolerance**

( Clause 4.2 )

| MTO-tolerance | <i>n</i> -Butylated Urea Formaldehyde Resins |                   | <i>n</i> -Butylated Melamine Formaldehyde Resins |                      |                   |
|---------------|----------------------------------------------|-------------------|--------------------------------------------------|----------------------|-------------------|
|               | Medium reactivity                            | High reactivity   | Low reactivity                                   | Medium reactivity    | High reactivity   |
|               | Medium MTO-tolerance                         | Low MTO-tolerance | High MTO-tolerance                               | Medium MTO-tolerance | Low MTO-tolerance |
|               | 15-30 ml                                     | 10-20 ml          | Infinite                                         | 40-80 ml             | 20-40 ml          |

**Table 2 Requirements for Amino Resins**  
( Clause 5.5 and 7.1 )

| SI No. | Characteristic                                            | Requirement                                     |                    |                                                     |                      |                    | Method of Test                 |
|--------|-----------------------------------------------------------|-------------------------------------------------|--------------------|-----------------------------------------------------|----------------------|--------------------|--------------------------------|
|        |                                                           | <i>n</i> -Butylated Urea<br>Formaldehyde Resins |                    | <i>n</i> -Butylated Melamine<br>Formaldehyde Resins |                      |                    |                                |
|        |                                                           | Medium<br>Reactivity                            | High<br>Reactivity | Low<br>Reactivity                                   | Medium<br>Reactivity | High<br>Reactivity |                                |
| (1)    | (2)                                                       | (3)                                             | (4)                | (5)                                                 | (6)                  | (7)                | (8)                            |
| i)     | Colour on gardner<br>scale (as supplied),<br><i>Max</i>   | 1                                               | 1                  | 1                                                   | 1                    | 1                  | <b>6.2</b> of IS 354 (Part 1)  |
| ii)    | Percent non-volatiles<br>(105 ± 2°C for 2 h)              | 65 ± 2                                          | 60 ± 2             | 65 ± 2                                              | 60 ± 2               | 60 ± 2             | <b>12</b> of IS 354 (Part 1)   |
| iii)   | Viscosity at 27 ± 2°C,<br>in poises                       | 17-27                                           | 7-15               | 5-15                                                | 10-20                | 10-20              | <b>8</b> of IS 354 (Part 1)    |
| iv)    | Acid value (as<br>supplied), <i>Max</i>                   | 3                                               | 3                  | 2                                                   | 2                    | 2                  | <b>15.1</b> of IS 354 (Part 1) |
| v)     | Free formalin percent<br>(as supplied), <i>Max</i>        | 0.5                                             | 0.5                | 0.5                                                 | 0.5                  | 0.5                | <b>8</b> of IS 354 (Part 6)    |
| vi)    | MTO-tolerance (ml<br>of MTO/10 g of resin<br>at 27 ± 2°C) | 15-30                                           | 10-20              | Infinite                                            | 40-80                | 20-40              | Annex B                        |
| vii)   | Relative Density (at<br>27°C ± 2)                         | 1.03 ± 0.02                                     | 1.01 ± 0.02        | 1.03 ± 0.02                                         | 1.01 ± 0.02          | 1.01 ± 0.02        | <b>7</b> of IS 354 (Part 1)    |

## 6 FORM OF SUPPLY

Amino resins shall be supplied as agreed to between the purchaser and supplier.

## 7 TESTS

7.1 Tests shall be conducted as prescribed in 5.2 to 5.5 and Table 2.

### 7.2 Quality of Reagents

Pure chemicals and distilled water (*see* IS 1070) shall be used.

NOTE — 'Pure chemicals' shall mean chemical that does not contain impurity, which affect the results of the analysis.

## 8 PACKING AND MARKING

### 8.1 Packing

The material shall be packed in sound, clean and dry containers as agreed to between the manufacturer and the purchaser.

### 8.2 Marking

8.2.1 The containers shall be marked with following details:

- Name of the material;
- Manufacturer's name and trade-mark, if any;

- Type and grade for example, *n*-Butylated urea formaldehyde resins, medium/high reactivity;
- Lead content (maximum);
- Toxic heavy metals content;
- Mass of the material;
- Batch number or Lot number in code or otherwise;
- Month and year of manufacture; and
- A cautionary note as below:
  - Keep out of reach of children; and
  - This product may be harmful if swallowed or inhaled.

### 8.2.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

8.2.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made there under. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 9 SAMPLING

Representative sample of the material shall be drawn as prescribed in 3 of IS 354 (Part 1).

**ANNEX A**

( Clause 2 )

**LIST OF REFERRED INDIAN STANDARDS**

| <i>IS No.</i>                 | <i>Title</i>                                                                                                                                         | <i>IS No.</i>          | <i>Title</i>                                                                                     |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------|
| 101 (Part 8/<br>Sec 5) : 1993 | Methods of sampling and test for paints, varnishes and related products: Part 8 Tests for pigments and other solids, Section 5 Lead restriction test | 354 (Part 6)<br>: 1989 | Methods of sampling and test for resins for paints: Part 6 Special test methods for amino resins |
|                               |                                                                                                                                                      | 1070 : 1992            | Reagent grade water                                                                              |
| 354 (Part 1)<br>: 1987        | Methods of sampling and test for resins for paints: Part 1 General test methods                                                                      | 1303 : 1983            | Glossary of terms relating to paints                                                             |
|                               |                                                                                                                                                      | 6667 : 1972            | Glossary of terms used in synthetic resin industry                                               |

**ANNEX B**

[ Table 2, Sl No. (vi) ]

**MINERAL TURPENTINE OIL TOLERANCE****B-1 APPARATUS**

Stoppered measuring glass cylinder of 100 ml capacity, graduated to min 0.5 ml.

**B-2 REAGENT**

Mineral turpentine oil (MTO).

**B-3 PROCEDURE**

Take 10 g of resin or resin solution in 100 ml measuring cylinder add mineral spirit slowly with shaking till

solution become transparent. Then add slowly the quantity of MTO further through the pipette (using of rubber bulb or flip style pipette filler/wheel style pipette filler) in small quantity at a time, shake and note when the mixture becomes cloudy. The mineral spirit tolerance is expressed as ml of MTO per 10 g of resin or resin solution. If mixture remains clear up to 100 ml, after shaking, then discard 90 ml and dilute the remaining 10 ml till cloudiness appears. Note the quantity now added which is for 1g, of resin; multiply by 10, to give tolerance for 10 gm of resin





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This Indian Standard has been developed from Doc No.: CHD 21 (12879).

### Amendments Issued Since Publication

| Amend No. | Date of Issue | Text Affected |
|-----------|---------------|---------------|
|           |               |               |
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